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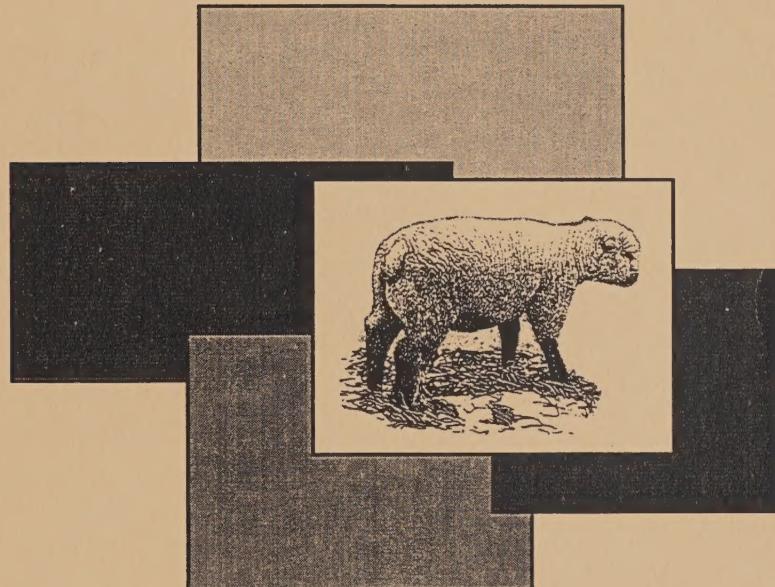
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Animal and
Plant Health
Inspection
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Veterinary
Services

Reference of 1996 U.S. Sheep Health and Management Practices



National Animal Health Monitoring System

September 1996

Acknowledgements

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This study was a cooperative effort, and we would like to thank all participants for their efforts and dedication. The American Sheep Industry Association (ASI) co-sponsored the project. ASI's Animal Health Committee helped develop and deliver data collection materials and reviewed this and other reports resulting from the data. Personnel at the University of Minnesota and Colorado State University assisted in questionnaire development. The National Agricultural Statistics Service (NASS) conducted the sample selection, and the Colorado Agricultural Statistics Service prepared mailing labels and helped coordinate the mailing.

The participating producers were also critical in the success of this project. Their voluntary efforts made this study possible.

A. Strating,
Dr. Al Strating, Director
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Introduction

The National Animal Health Monitoring System (NAHMS) is sponsored by the USDA:APHIS:Veterinary Services (VS). From 1989 through 1996, NAHMS conducted national studies of the swine, dairy cattle, beef cow/calf, and beef feedlot industries to obtain information on animal health and management.

In 1995, NAHMS collaborated with the Research and Education Division of the American Sheep Industry Association (ASI) in developing a needs assessment tool to identify the most important health and productivity factors for the sheep industry. The groups planned to use the resulting information to develop programs and projects to enhance the profitability of sheep.

For this sheep study, the USDA's National Agricultural Statistics Service (NASS) collaborated with VS to select a producer sample that was statistically designed to provide estimates for the United States sheep population (in the 48 contiguous states). The NAHMS/ASI questionnaires were mailed to 19,807 eligible sheep operations in January 1996 with postage-paid, return envelopes. A post card reminder was sent 4 weeks after the initial mailing. In addition, a 1-800 telephone number was provided so that participants could call with questions.

Data were summarized from 5,174 respondents.

This first report documenting the needs assessment study results was released in conjunction with a summary of regional study results, the *Reference of 1996 U.S. Regional Sheep Health and Management Practices*.¹ Subsequent releases will discuss specific topics addressed by the study. All NAHMS sheep needs assessment results are available on the World Wide Web at <http://www.aphis.usda.gov/vs/ceah>.

For questions about this report or additional NAHMS results, please contact:

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¹ Wording on table and figure headings in this report reflect that used on the questionnaire. Unless specifically indicated, respondents were not given further definitions or instructions on how to respond.

Terms Used in This Report

Flock size: data throughout the report are often summarized by five size groupings or categories based on the total number of sheep and lambs on January 1, 1996, reported for each operation.

Operation average: a single value for each operation is summed over all operations reporting divided by the number of operations reporting. For instance, operation average percent of gross income is calculated by summing the reported percent over all operations then dividing by the number of operations.

Percent operations: number of operations with a given characteristic divided by the total number of operations.

Percent sheep/lambs: the sum of the actual number of sheep/lambs on each operation with a given characteristic divided by the total number of sheep on all operations. (**Percent**

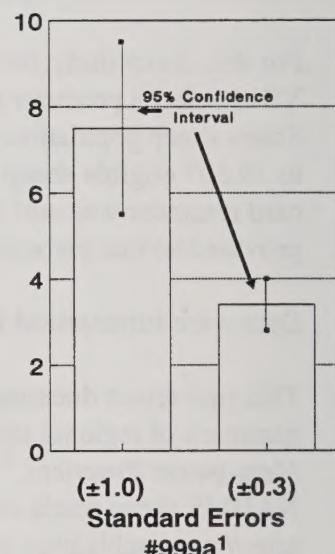
sheep/lambs on operations: an operation characteristic was applied to all sheep/lambs on the operation. The total number of sheep/lambs residing on operations with a given characteristic divided by the total sheep/lambs on all operations. See the example on page 3, percent of sheep on operations by expected change in inventory.)

Primary breed category: producers identified one primary breed category and all sheep and lambs on the operation were summarized in that category.

Population estimates: averages and proportions weighted to represent the population. Most of the estimates in this report are provided with a measure of variability called the standard error and denoted by (\pm) . Chances are 95 out of 100 that the interval created by the estimate plus or minus two standard errors will contain the true population value. In the example at right, an estimate of 7.5 with a standard error of ± 1.0 results in a range of 5.5 to 9.5 (two times the standard error above and below the estimate.) The second estimate of 3.4 shows a standard error of ± 0.3 results with a range of 2.8 and 4.0.

Sample profile: information that describes characteristics of the operations from which the data were collected.

Examples of
95% Confidence Intervals



¹ Identification numbers are assigned to each graph in this report for public reference.

Part 1 - Section 1: Population Estimates

A. Flock Management

1. Inventory and Expected Change by 2001.

a. U.S. sheep and lamb inventory, January 1, 1996¹:

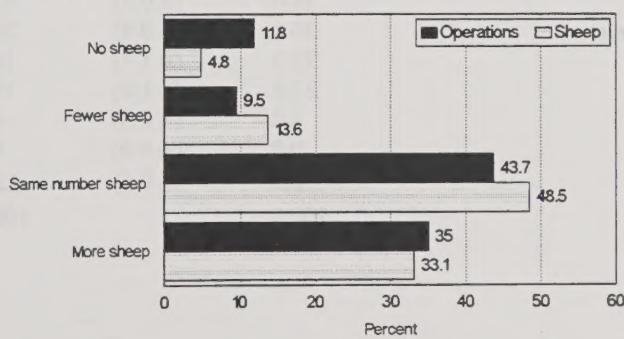
<u>Category</u>	<u>Number Head</u>	<u>Totals</u>
Breeding sheep 1 year or older:		
Ewes	5,125,100	
Rams	235,300	
Replacement lambs	<u>863,100</u>	
Total breeding sheep and lambs		6,223,500
Market sheep and lambs:		
Sheep	82,100	
Lambs	<u>2,151,500</u>	
Total market sheep and lambs		<u>2,233,600</u>
All sheep and lambs (50 states)		8,457,100
All sheep and lambs (48 states)		8,433,400

b.	<u>Operations</u>	<u>Number</u>
Operations with sheep in 1995 ¹ (50 states)		82,120
Operations with sheep in 1995 (48 contiguous states)		82,040

c. Percent of operations (and percent of sheep on these operations) by number of sheep expected in 2001 compared to January 1, 1996, inventory:

<u>Expected Change</u>	<u>Percent Operations</u>	<u>Standard Error</u>	<u>Percent Sheep²</u>	<u>Standard Error</u>
No sheep in 2001	11.8	(± 0.8)	4.8	(± 0.5)
Fewer sheep in 2001	9.5	(± 0.7)	13.6	(± 1.6)
Same number in 2001	43.7	(± 1.2)	48.5	(± 2.6)
More sheep in 2001	<u>35.0</u>	(± 1.1)	<u>33.1</u>	(± 2.4)
Total	100.0		100.0	

Percent of Operations (and Percent of Sheep)
by Change in Number of Sheep Expected in 2001*



*Compared to January 1, 1996, inventory.

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1 Source: USDA:National Agricultural Statistics Service (NASS.)

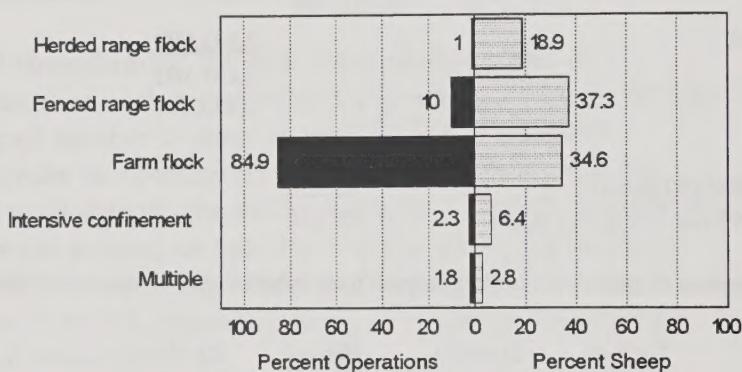
2 Refers to percent of total sheep and lambs as of January 1, 1996.

2. Primary Flock Type

a. Percent of operations (and percent of sheep on these operations) by primary flock type:

<u>Flock Type</u>	Percent Operations	Standard Error	Percent Sheep	Standard Error
Hherded range flock	1.0	(± 0.1)	18.9	(± 2.4)
Fenced range flock	10.0	(± 0.6)	37.3	(± 2.3)
Farm flock	84.9	(± 0.8)	34.6	(± 1.6)
Intensive confinement	2.3	(± 0.3)	6.4	(± 2.5)
Multiple ¹	1.8	(± 0.3)	2.8	(± 0.5)
Total	100.0		100.0	

Percent of Operations (and Percent of Sheep)
by Primary Flock Type



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3. Primary Breed

a. Percent of operations (and percent of sheep on these operations) by primary breed category:

<u>Breed Category</u>	Percent Operations	Standard Error	Percent Sheep	Standard Error
Colored wool	2.4	(± 0.3)	0.6	(± 0.1)
Fine wool white face	13.0	(± 0.7)	41.8	(± 2.4)
Medium wool white face	20.6	(± 0.9)	26.0	(± 2.4)
Black face	32.3	(± 1.1)	10.2	(± 0.7)
Crossbred	23.8	(± 1.0)	15.6	(± 2.4)
Hair sheep	1.0	(± 0.3)	0.4	(± 0.1)
Milk sheep	0.0	(± 0.0)	0.0	(± 0.0)
Multiple	6.9	(± 0.6)	5.4	(± 0.7)
Total	100.0		100.0	

1 Producers selecting more than one category.

4. Production Records Used

a. Percent of operations by types of production records used to make decisions:

<u>Record Type</u>	<u>Percent Operations</u>	<u>Standard Error</u>
Manual	77.1	(± 1.1)
Computerized	10.8	(± 0.7)
Other	1.7	(± 0.3)
None	19.5	(± 1.0)

5. Source of Sheep Information

a. Percent of operations using each source for sheep information:

<u>Information Source</u>	<u>Percent Operations</u>	<u>Standard Error</u>
SID Sheep Production Handbook	24.1	(± 0.9)
Other books	50.5	(± 1.2)
Magazines/Newsletters	70.5	(± 1.1)
Fairs/Shows	42.3	(± 1.2)
Meetings	35.4	(± 1.1)
Internet	2.7	(± 0.4)
University/Extension	49.2	(± 1.2)
Veterinarians	63.3	(± 1.1)
Feed and drug salesmen	26.5	(± 1.0)
Shearer	49.5	(± 1.2)
Other sheep producers	69.4	(± 1.1)

6. Altered Management Practices

a. Percent of operations that altered the following management practices in the last 5 years due to animal welfare concerns:

<u>Practice</u>	<u>Percent Operations</u>	<u>Standard Error</u>
Docking tails	17.6	(± 0.9)
Castration	15.9	(± 0.9)
Shearing	14.7	(± 0.8)
Disposal of dead animals and offal	21.2	(± 1.0)
Housing	15.9	(± 0.9)
Predator control	18.8	(± 0.9)

B. Births, Deaths, Culling, and Illness

1. Productivity

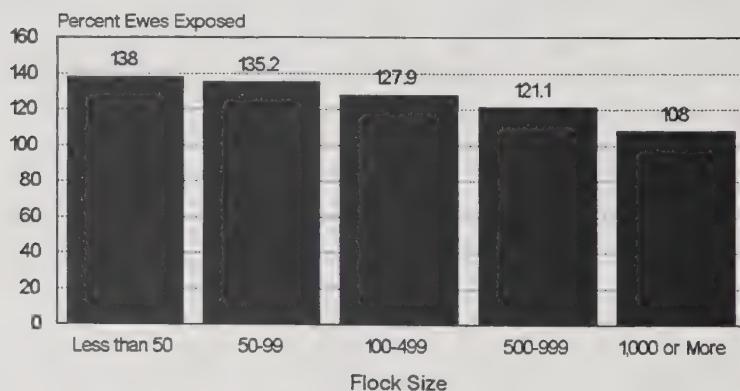
a. Lamb outcomes as a percent of ewes exposed in 1995:

<u>Outcome</u>	<u>Percent Lambs</u>	<u>Standard Error</u>
Aborted (at less than full term)	1.8	(± 0.1)
Born dead (full term)	4.0	(± 0.1)
Born alive	121.3	(± 1.2)

i. Lamb outcomes as a percent of ewes exposed in 1995 by flock size:

<u>Outcome</u>	<u>Percent Lambs</u>					<u>Number of Sheep</u>			<u>Percent Lambs</u>		
	<u>Less than 50</u>	<u>Standard Error</u>	<u>50-99</u>	<u>Standard Error</u>	<u>100-499</u>	<u>Standard Error</u>	<u>500-999</u>	<u>Standard Error</u>	<u>1,000 or More</u>	<u>Standard Error</u>	
Aborted (at less than full term)	1.5	(± 0.1)	1.9	(± 0.2)	2.1	(± 0.2)	1.4	(± 0.2)	1.8	(± 0.3)	
Born dead (full term)	7.0	(± 0.3)	5.4	(± 0.3)	4.1	(± 0.1)	3.1	(± 0.4)	1.8	(± 0.2)	
Born alive	138.0	(± 1.4)	135.2	(± 2.8)	127.9	(± 2.2)	121.1	(± 3.9)	108.0	(± 2.1)	

**Lambs Born Alive as a Percent of Ewes Exposed
in 1995 by Flock Size**



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b. Of lambs born alive, percent that died before weaning:

<u>Percent Lambs</u>	<u>Standard Error</u>
9.4	(± 0.3)

i. Of lambs born alive, percent that died before weaning by flock size:

<u>Less than 50</u>	<u>Percent Lambs</u>					<u>Number of Sheep</u>			<u>Percent Lambs</u>		
	<u>Standard Error</u>	<u>50-99</u>	<u>Standard Error</u>	<u>100-499</u>	<u>Standard Error</u>	<u>500-999</u>	<u>Standard Error</u>	<u>1,000 or More</u>	<u>Standard Error</u>		
11.1	(± 0.6)	8.0	(± 0.5)	8.3	(± 0.4)	9.2	(± 1.1)	9.6	(± 0.7)		

2. Culling and Mortality

a. Sheep 1 year of age and older that left the flock in 1995 due to death or culling, as a percent of January 1, 1996, inventory (ewes and rams 1 year of age or older):

<u>Exit Reason</u>	<u>Percent Sheep</u>	<u>Standard Error</u>
Cull	16.1	(± 2.0)
Died	<u>5.1</u>	(± 0.1)
Total	21.2	

i. Sheep 1 year of age and older that left the flock in 1995 due to death or culling, as a percent of January 1, 1996, inventory (ewes and rams 1 year of age or older) by flock size:

<u>Exit Reason</u>	<u>Percent Sheep</u>						<u>Standard Error</u>	<u>1,000 or More</u>	<u>Standard Error</u>	
	<u>Less than 50</u>	<u>Standard Error</u>	<u>50-99</u>	<u>Standard Error</u>	<u>100-499</u>	<u>Standard Error</u>				
Were culled	19.4	(± 0.9)	15.1	(± 2.5)	13.5	(± 1.4)	12.1	(± 0.8)	17.4	(± 4.5)
Died	<u>8.3</u>	(± 0.5)	<u>5.7</u>	(± 0.4)	<u>4.9</u>	(± 0.2)	<u>3.5</u>	(± 0.2)	<u>4.3</u>	(± 0.2)
Total	27.7		20.8		18.4		15.6		21.7	

b. Of sheep 1 year of age and older that were culled or died in 1995, percent culled or died by reason:

<u>Exit Reason</u>	<u>Percent Sheep</u>	<u>Standard Error</u>
Mastitis	4.4	(± 0.5)
Poor udder/teat conformation	1.9	(± 0.3)
'Hard bag' syndrome	<u>3.2</u>	(± 0.3)
Poor milk production	2.4	(± 0.3)
Teeth problems	3.9	(± 0.6)
Old age	29.6	(± 3.0)
Thin ewe	4.2	(± 0.8)
Failure to lamb (open, aborted)	6.0	(± 0.4)
Failure to wean (birthing problems, poor mothering, lambs died)	2.8	(± 0.4)
Other reproductive problems (low productivity, pregnancy disease, etc.)	1.9	(± 0.3)
Respiratory problems	1.8	(± 0.3)
Infectious footrot	1.4	(± 0.2)
Lameness, not footrot	0.6	(± 0.1)
Poor leg/feet conformation	0.1	(± 0.0)
Accidental injury	1.1	(± 0.1)
Predator	7.7	(± 0.9)
Behavioral faults	0.4	(± 0.1)
Poisoning	0.9	(± 0.1)
Ram breeding soundness	0.5	(± 0.2)
Economic	16.2	(± 8.2)
Other	5.0	(± 0.7)
Not reported	<u>4.0</u>	(± 0.7)
Total	100.0	

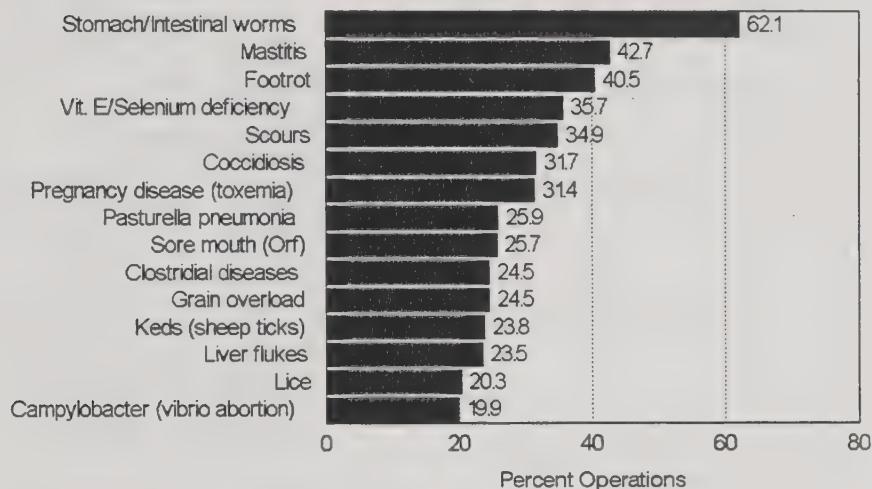
3. Morbidity

a. Percent of operations that reported moderate or high concern¹ for the following conditions:

<u>Condition</u>	<u>Percent Operations</u>	<u>Standard Error</u>
Chlamydia (enzootic abortion)	18.1	(± 0.8)
Campylobacter (vibrio abortion)	19.9	(± 0.8)
Toxoplasmosis abortion	16.0	(± 0.8)
Salmonellosis	8.5	(± 0.6)
Border disease (hairy shaker disease)	5.1	(± 0.5)
Bluetongue	9.2	(± 0.6)
Epididymitis (<i>B. ovis</i>)	11.8	(± 0.7)
Lamb epididymitis (Histomoniasis/Actinobacillus)	8.4	(± 0.6)
Scours	34.9	(± 1.1)
Cryptosporidiosis	7.8	(± 0.6)
Coccidiosis	31.7	(± 1.0)
Stomach/intestinal worms	62.1	(± 1.2)
Liver flukes	23.5	(± 1.0)
Pasteurella pneumonia	25.9	(± 1.0)
Sore mouth (Orf)	25.7	(± 1.0)
Clostridial diseases	24.5	(± 1.0)
Vitamin E/Selenium deficiency (white muscle disease)	35.7	(± 1.1)
Grain overload (rumen acidosis)	24.5	(± 1.0)
Polio (polioencephalomalacia)	8.4	(± 0.6)
Listeriosis (circling disease)	9.3	(± 0.7)
Pregnancy disease (toxemia)	31.4	(± 1.1)
Milk fever (hypocalcemia)	19.1	(± 0.9)
Mastitis	42.7	(± 1.2)
Caseous lymphadenitis (Cl. bovis, abscess)	16.8	(± 0.8)
Ovine progressive pneumonia (OPP)	18.3	(± 0.9)
Johne's disease (paratuberculosis)	7.7	(± 0.6)
Bad teeth	17.1	(± 0.9)
Nutritional wasting	17.0	(± 0.8)
Scrapie	18.4	(± 0.9)
Footrot	40.5	(± 1.1)
Foot scald	19.0	(± 0.9)
Foot abscess	15.3	(± 0.8)
Lice	20.3	(± 0.9)
Keds (sheep ticks)	23.8	(± 0.9)
Fly strike	16.9	(± 0.8)
Copper toxicity	14.9	(± 0.8)
Plant toxicity	13.4	(± 0.8)
Genetic disorder	10.9	(± 0.7)
Other	5.6	(± 0.5)

¹ Respondents were asked to consider the overall potential effects on their flock and customers (on a four-point concern scale), regardless of whether the condition existed in their flock.

**Percent of Operations that Reported
Moderate or High Concern for the Following Conditions***



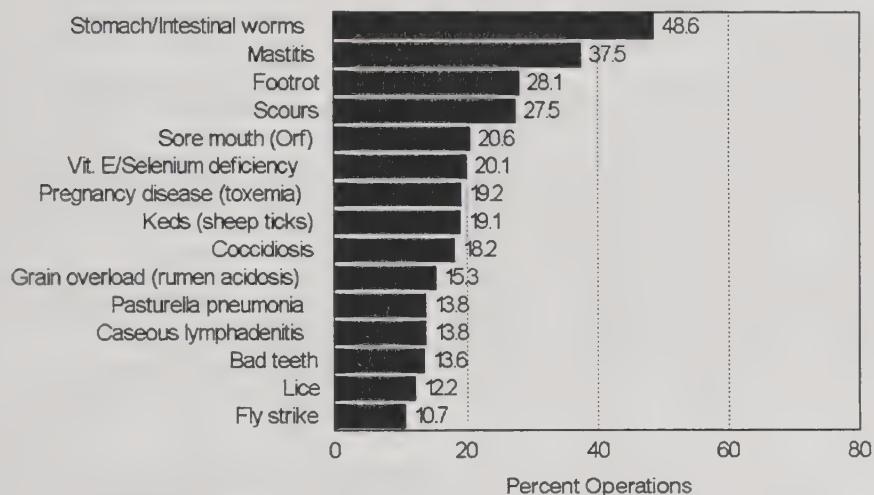
*Top 15 conditions of concern.

#3198

b. Percent of operations on which the following conditions were known to be present (suspected or confirmed) in the previous 5 years:

<u>Condition</u>	<u>Percent Operations</u>	<u>Standard Error</u>
Chlamydia (enzootic abortion)	4.4	(± 0.3)
Campylobacter (vibrio abortion)	4.6	(± 0.3)
<u>Toxoplasmosis abortion</u>	3.3	(± 0.4)
Salmonellosis	1.0	(± 0.1)
Border disease (hairy shaker disease)	0.7	(± 0.1)
<u>Bluetongue</u>	2.6	(± 0.3)
Epididymitis (<i>B. ovis</i>)	1.5	(± 0.1)
Lamb epididymitis (Histomoniasis/Actinobacillus)	0.9	(± 0.1)
<u>Scours</u>	27.5	(± 1.0)
Cryptosporidiosis	1.0	(± 0.1)
Coccidiosis	18.2	(± 0.8)
<u>Stomach/intestinal worms</u>	48.6	(± 1.2)
Liver flukes	7.5	(± 0.5)
Pasteurella pneumonia	13.8	(± 0.7)
<u>Sore mouth (Orf)</u>	20.6	(± 0.8)
Clostridial diseases	9.8	(± 0.6)
Vitamin E/Selenium deficiency (white muscle disease)	20.1	(± 0.9)
<u>Grain overload (rumen acidosis)</u>	15.3	(± 0.8)
Polio (polioencephalomalacia)	3.0	(± 0.3)
Listeriosis (circling disease)	3.7	(± 0.4)
<u>Pregnancy disease (toxemia)</u>	19.2	(± 0.8)
Milk fever (hypocalcemia)	8.7	(± 0.6)
Mastitis	37.5	(± 1.1)
<u>Caseous lymphadenitis (Cl. bovis, abscess)</u>	13.8	(± 0.7)
Ovine progressive pneumonia (OPP)	5.1	(± 0.4)
Johne's disease (paratuberculosis)	0.8	(± 0.1)
<u>Bad teeth</u>	13.6	(± 0.7)
Nutritional wasting	7.1	(± 0.5)
Scrapie	1.2	(± 0.2)
<u>Eootrot</u>	28.1	(± 1.0)
Foot scald	10.6	(± 0.6)
Foot abscess	7.6	(± 0.5)
<u>Lice</u>	12.2	(± 0.7)
Keds (sheep ticks)	19.1	(± 0.9)
Fly strike	10.7	(± 0.6)
<u>Copper toxicity</u>	2.7	(± 0.4)
Plant toxicity	6.9	(± 0.6)
Genetic disorder	5.2	(± 0.5)
Other	3.6	(± 0.5)

Percent of Operations on Which the Following Conditions
Were Known to Be Present in Last 5 Years*



*Top 15 conditions present.

#3199

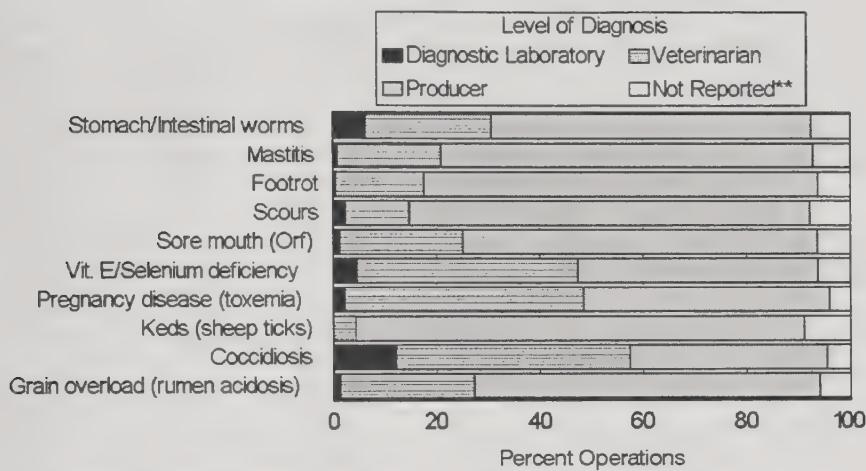
c. For operations that had the following conditions (suspected or confirmed) in the previous 5 years, percent of operations by the highest level¹ of diagnosis:

<u>Condition</u>	<u>Percent Operations</u> ²				
	Diagnostic Standard Laboratory	Standard Error	Standard Veterinarian Error	Standard Producer	Standard Error
Chlamydia (enzootic abortion)	23.2	(± 2.5)	31.6 (± 3.6)	40.0	(± 4.0)
Campylobacter (vibrio abortion)	21.7	(± 2.5)	31.0 (± 3.5)	43.2	(± 3.7)
Toxoplasmosis abortion	16.3	(± 2.7)	40.2 (± 5.9)	36.3	(± 5.2)
Salmonellosis	14.9	(± 3.9)	36.1 (± 6.9)	42.8	(± 7.3)
Border disease (hairy shaker disease)	12.0	(± 3.9)	27.8 (± 9.4)	56.5	(± 8.7)
<u>Bluetongue</u>	12.3	(± 3.4)	34.3 (± 5.2)	49.1	(± 5.5)
Epididymitis (<i>B. ovis</i>)	28.6	(± 4.0)	31.2 (± 4.4)	33.1	(± 4.5)
Lamb epididymitis (Histomoniasis/Actinobacillus)	7.0	(± 3.3)	22.6 (± 6.1)	54.5	(± 8.8)
Scours	2.4	(± 0.4)	12.3 (± 1.3)	77.5	(± 1.8)
Cryptosporidiosis	10.9	(± 4.2)	32.1 (± 7.1)	52.8	(± 7.5)
Coccidiosis	12.2	(± 1.4)	45.2 (± 2.3)	38.1	(± 2.3)
<u>Stomach/intestinal worms</u>	6.4	(± 0.6)	24.4 (± 1.4)	61.7	(± 1.5)
Liver flukes	6.0	(± 2.0)	33.8 (± 3.6)	49.9	(± 3.8)
Pasteurella pneumonia	6.4	(± 1.3)	38.2 (± 2.9)	48.5	(± 2.8)
<u>Sore mouth (Orf)</u>	1.3	(± 0.4)	23.9 (± 1.9)	68.3	(± 2.1)
Clostridial diseases	7.8	(± 1.9)	36.2 (± 3.2)	50.2	(± 3.2)
Vitamin E/Selenium deficiency (white muscle disease)	4.6	(± 0.7)	42.8 (± 2.4)	46.4	(± 2.4)
<u>Grain overload (rumen acidosis)</u>	1.4	(± 0.4)	25.9 (± 2.4)	66.7	(± 2.6)
Polio (polioencephalomalacia)	17.3	(± 4.6)	42.7 (± 4.8)	35.0	(± 4.7)
Listeriosis (circling disease)	6.0	(± 1.9)	43.7 (± 5.5)	45.6	(± 5.0)
<u>Pregnancy disease (toxemia)</u>	2.2	(± 0.6)	46.3 (± 2.3)	47.4	(± 2.3)
Milk fever (hypocalcemia)	1.4	(± 0.6)	34.1 (± 3.6)	57.4	(± 3.6)
Mastitis	0.9	(± 0.2)	20.0 (± 1.5)	71.9	(± 1.6)
<u>Caseous lymphadenitis (Cl, boils, abscess)</u>	2.7	(± 0.6)	19.3 (± 1.9)	73.7	(± 2.1)
Ovine progressive pneumonia (OPP)	18.8	(± 3.4)	27.6 (± 3.8)	44.5	(± 3.9)
Johne's disease (paratuberculosis)	16.6	(± 4.3)	11.5 (± 5.5)	54.6	(± 8.5)
Bad teeth	0.0	(± 0.0)	2.8 (± 0.8)	88.7	(± 1.8)
Nutritional wasting	1.0	(± 0.4)	3.7 (± 0.9)	84.8	(± 2.6)
Scrapie	18.7	(± 8.4)	26.2 (± 8.3)	47.0	(± 9.2)
Footrot	0.6	(± 0.2)	16.9 (± 1.5)	76.2	(± 1.7)
Foot scald	0.9	(± 0.5)	17.6 (± 2.4)	72.8	(± 2.7)
Foot abscess	1.0	(± 0.7)	18.3 (± 2.8)	67.0	(± 3.3)
Lice	0.7	(± 0.4)	9.5 (± 1.7)	80.7	(± 2.3)
Keds (sheep ticks)	0.1	(± 0.1)	4.3 (± 0.9)	86.6	(± 1.7)
Fly strike	0.1	(± 0.1)	5.3 (± 1.2)	86.9	(± 1.8)
<u>Copper toxicity</u>	26.2	(± 5.9)	33.1 (± 6.5)	35.8	(± 6.9)
Plant toxicity	1.6	(± 0.8)	17.8 (± 3.3)	69.4	(± 3.8)
Genetic disorder	3.8	(± 1.7)	20.4 (± 3.9)	62.8	(± 4.6)
Other	9.8	(± 2.9)	23.9 (± 5.2)	54.1	(± 6.4)

¹ Diagnostic laboratory was considered the highest level followed by a veterinarian, then producer.

² Not all producers that had the condition in the previous 5 years identified who made the diagnosis.

**Percent of Operations* by Highest Level of Diagnosis
for the 10 Most Common Conditions**



*On operations where condition was known to be present in previous 5 years.

**Not all producers whose sheep had the condition in the previous 5 years identified who made the diagnosis.

#3200

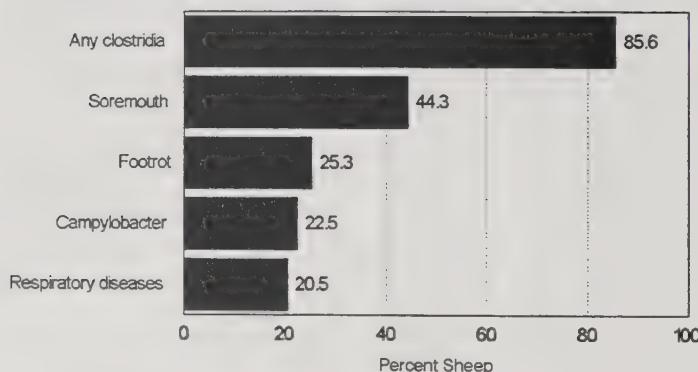
C. Health Management

1. Vaccines

a. Percent of operations (and percent of sheep on these operations) by vaccines used at least once within the previous 3 years:

<u>Vaccine</u>	Percent Operations	Standard Error	Percent Sheep	Standard Error
Clostridia C & D (overeating)	58.7	(± 1.2)	77.7	(± 1.5)
Clostridia CDT (tetanus)	56.7	(± 1.1)	53.0	(± 2.5)
<u>Clostridia 7- or 8-way</u>	25.2	(± 1.0)	32.0	(± 2.2)
Any clostridia	72.8	(± 1.1)	85.6	(± 1.3)
Soremouth	14.8	(± 0.8)	44.3	(± 2.3)
<u>Chlamydia</u>	6.7	(± 0.5)	17.3	(± 2.8)
Campylobacter (vibrio)	12.3	(± 0.7)	22.5	(± 2.1)
<i>E. coli</i>	8.8	(± 0.7)	13.4	(± 2.4)
<u>Respiratory diseases</u>	14.6	(± 0.8)	20.5	(± 2.7)
Bluetongue	2.0	(± 0.3)	7.4	(± 1.3)
Footrot	17.0	(± 0.8)	25.3	(± 2.8)
<u>Caseous lymphadenitis</u>	2.5	(± 0.3)	5.7	(± 2.0)
Other	2.0	(± 0.3)	2.0	(± 0.5)

Percent of Sheep on Operations* that Vaccinated Against the Following Diseases at Least Once in the Previous 3 Years



*On operations reporting specific vaccine use.

#3201

2. Dewormers

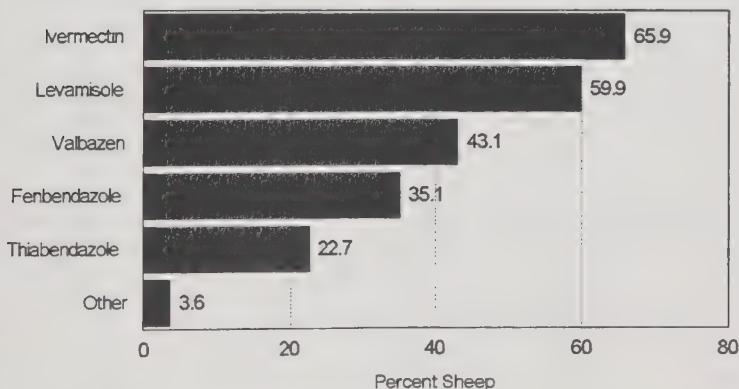
a. For operations that dewormed the following types of sheep, percent of operations by frequency of rotating dewormers:

<u>Frequency</u>	<u>Percent Operations</u>					
	Standard Lambs	Breeding Stock	Standard Error	Feeder Lambs	Standard Error	
Not rotated	47.3	(± 1.3)	32.4	(± 1.2)	45.8	(± 1.5)
Less frequently than yearly	12.3	(± 0.9)	14.7	(± 0.9)	13.6	(± 1.0)
Yearly	15.0	(± 0.9)	22.0	(± 1.0)	14.4	(± 1.0)
More frequently than yearly	<u>25.4</u>	(± 1.1)	<u>30.9</u>	(± 1.1)	<u>26.2</u>	(± 1.3)
Total	100.0		100.0		100.0	

b. Percent of operations (and percent of sheep on those operations) that used the following dewormers in the previous 3 years:

<u>Dewormer</u>	<u>Percent Operations</u>	<u>Standard Error</u>	<u>Percent Sheep</u>	<u>Standard Error</u>
Ivermectin	67.1	(± 1.1)	65.9	(± 2.4)
Valbazen	22.0	(± 0.8)	43.1	(± 2.6)
Levamisole	48.0	(± 1.2)	59.9	(± 2.2)
Thiabendazole	35.4	(± 1.2)	22.7	(± 2.1)
Fenbendazole	30.3	(± 1.0)	35.1	(± 2.7)
Other	4.0	(± 0.5)	3.6	(± 0.5)
None	8.3	(± 0.7)	7.7	(± 0.9)

Percent of Sheep on Operations* that Gave the Following Dewormers in the Previous 3 Years



#3202

* On operations reporting specific dewormer use.

3. Additives

a. Percent of operations that used the following additives in the previous 3 years:

<u>Additive</u>	<u>Percent Operations</u>	<u>Standard Error</u>
Coccidiostats in feed or water	21.0	(± 0.8)
Antibiotics in feed or water	35.0	(± 1.1)
Growth promotants in feed or water	6.3	(± 0.5)
Hormone implants in lambs	1.7	(± 0.2)

i. Percent of operations that used the following additives in the previous 3 years by flock size:

<u>Additive</u>	Percent Operations			Number Sheep			Standard Error			Standard Error	
	Less than 50	Standard Error	50-99	Standard Error	100-499	Standard Error	500-999	Standard Error	1,000 or More	Standard Error	
Coccidiostats in feed or water	16.6	(± 1.1)	32.2	(± 2.1)	36.8	(± 1.7)	34.9	(± 3.9)	25.9	(± 2.4)	
Antibiotics in feed or water	30.1	(± 1.4)	49.2	(± 2.4)	51.0	(± 2.0)	45.4	(± 4.1)	47.1	(± 2.8)	
Growth promotants in feed or water	5.3	(± 0.7)	9.6	(± 1.3)	9.2	(± 0.9)	9.6	(± 1.9)	9.4	(± 1.5)	
Hormone implants in lambs	1.1	(± 0.3)	2.4	(± 0.8)	4.0	(± 0.7)	6.0	(± 1.6)	4.0	(± 0.9)	

4. Reproductive management practices

a. Of operations that had at least one ewe, percent of operations by reproductive management practice used:

<u>Practice</u>	<u>Percent Operations</u>	<u>Standard Error</u>
Breeding soundness exam	20.5	(± 0.9)
Out of season breeding	21.8	(± 0.9)
Accelerated lambing	7.9	(± 0.5)
Flushing	54.7	(± 1.2)
Use of teasers	7.7	(± 0.5)
Estrus synchronization	3.3	(± 0.3)
Artificial insemination	1.2	(± 0.2)
Embryo transfer	0.2	(± 0.1)
Ultrasound (pregnancy diagnosis, fetal counting)	6.0	(± 0.4)

i. Percent of operations by reproductive management practice used and flock size:

<u>Practice</u>	<u>Percent Operations</u>								<u>Number Sheep</u>
<u>Less than 50</u>	<u>Standard Error</u>	<u>50-99</u>	<u>Standard Error</u>	<u>100-499</u>	<u>Standard Error</u>	<u>500-999</u>	<u>Standard Error</u>	<u>1,000 or More</u>	<u>Standard Error</u>
Breeding soundness exam	15.6	(± 1.1)	31.2	(± 2.1)	35.5 (± 1.7)	48.5	(± 3.5)	51.4	(± 3.0)
Out of season breeding	18.8	(± 1.1)	30.4	(± 2.1)	33.3 (± 1.7)	25.2	(± 3.9)	22.9	(± 2.5)
Accelerated lambing	5.6	(± 0.6)	14.2	(± 1.6)	16.6 (± 1.3)	12.3	(± 3.5)	9.2	(± 1.8)
Flushing	48.6	(± 1.5)	72.7	(± 2.3)	73.0 (± 1.9)	76.9	(± 2.7)	68.4	(± 2.8)
Use of teasers	5.5	(± 0.6)	13.2	(± 1.6)	14.6 (± 1.1)	19.7	(± 3.7)	14.3	(± 2.7)
Estrus synchronization	2.2	(± 0.4)	5.9	(± 1.1)	6.8 (± 0.7)	6.3	(± 1.4)	7.3	(± 1.8)
Artificial insemination	0.8	(± 0.3)	2.7	(± 1.0)	2.6 (± 0.5)	2.6	(± 1.0)	2.5	(± 0.9)
Embryo transfer	0.1	(± 0.1)	1.1	(± 0.8)	0.2 (± 0.1)	0.7	(± 0.4)	1.4	(± 0.7)
Ultrasound (pregnancy diagnosis, fetal counting)	3.2	(± 0.5)	9.8	(± 1.4)	15.1 (± 1.3)	23.3	(± 3.6)	34.3	(± 3.0)

5. Diagnostic practices

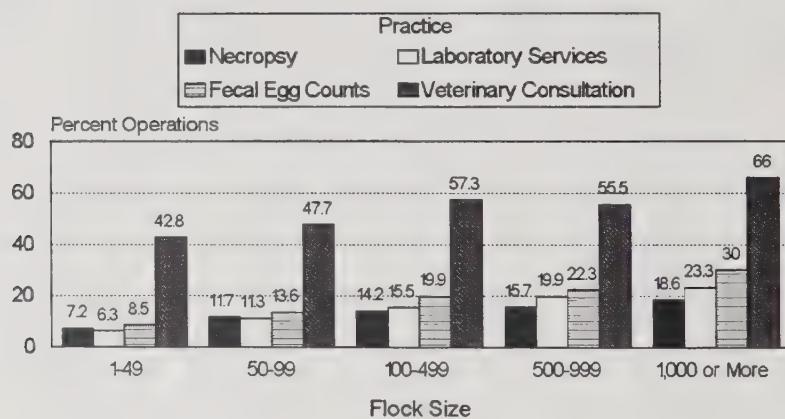
a. Percent of operations that used the following diagnostic practices:

<u>Practice</u>	<u>Percent Operations</u>	<u>Standard Error</u>
Necropsy	8.8	(± 0.6)
Laboratory services (serology, culture)	8.3	(± 0.5)
Fecal egg counts	10.9	(± 0.6)
Veterinary consultation	45.5	(± 1.2)
Other	1.9	(± 0.3)

i. Percent of operations that used the following diagnostic practices by flock size:

<u>Practice</u>	<u>Percent Operations Number Sheep</u>					
	<u>Less than 50</u>	<u>Standard Error</u>	<u>50-99</u>	<u>Standard Error</u>	<u>100-499</u>	<u>Standard Error</u>
Necropsy	7.2	(± 0.7)	11.7	(± 1.4)	14.2	(± 1.1)
Laboratory services (serology, culture)	6.3	(± 0.7)	11.3	(± 1.3)	15.5	(± 1.1)
Fecal egg counts	8.5	(± 0.8)	13.6	(± 1.4)	19.9	(± 1.6)
Veterinary consultation	42.8	(± 1.5)	47.7	(± 2.4)	57.3	(± 1.9)
Other	1.9	(± 0.4)	2.1	(± 0.6)	1.2	(± 0.3)
					<u>1,000 or More</u>	<u>Standard Error</u>
					18.6	(± 2.2)
					23.3	(± 2.3)
					30.0	(± 2.6)
					66.0	(± 2.5)
					3.5	(± 1.0)

**Percent of Operations that Used the Following
Diagnostic Practices by Flock Size**



#3203

D. Predator Management

1. Use of any predator management practice

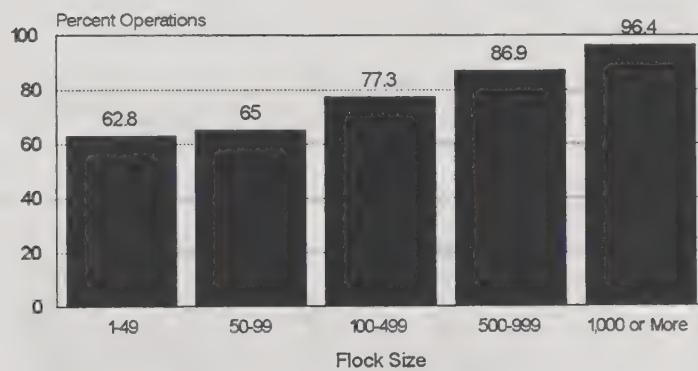
a. Percent of operations that used any predator management practice:

<u>Percent Operations</u>	<u>Standard Error</u>
65.5	(± 1.2)

i. Percent of operations that used a predator management practice by flock size:

<u>Less than 50</u>	<u>Standard Error</u>	<u>Percent Operations</u>		<u>Number Sheep</u>		<u>Standard Error</u>	<u>1,000 or More Standard Error</u>		
		<u>50-99</u>	<u>Standard Error</u>	<u>100-499</u>	<u>Standard Error</u>				
62.8	(± 1.5)	65.0	(± 2.2)	77.3	(± 1.4)	86.9	(± 3.1)	96.4	(± 0.9)

Percent of Operations that Used a Predator Management Practice by Flock Size



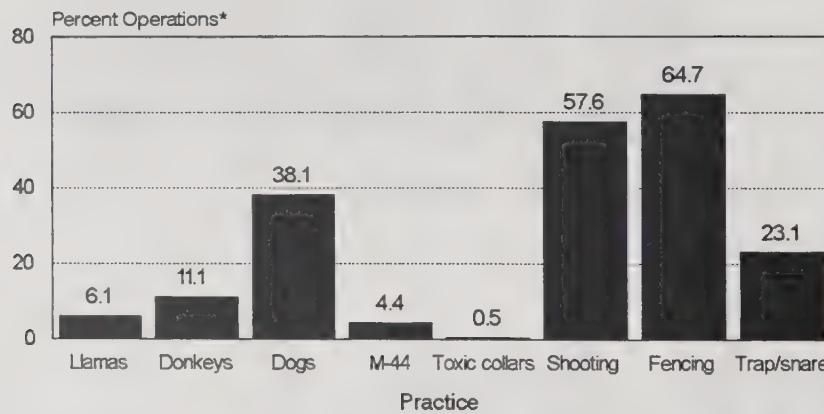
#3204

2. Specific predator management practices used

a. Of operations that used a predator management practice, percent that used the following practices:

	<u>Percent Operations</u>	<u>Standard Error</u>
i. <u>Guardian Animals</u>		
Llamas	6.1	(± 0.6)
Donkeys	11.1	(± 0.9)
Dogs	38.1	(± 1.4)
Any of the above	51.2	(± 1.5)
ii. <u>Lethal Methods</u>		
M-44	4.4	(± 0.3)
Toxic collars	0.5	(± 0.1)
Shooting	57.6	(± 1.4)
Any of the above	61.9	(± 1.5)
iii. <u>Other Methods</u>		
Fencing	64.7	(± 1.4)
Trap/snare	23.1	(± 1.1)
Other ¹	10.0	(± 0.9)

Percent of Operations* that Used the Following Predator Management Practices



*Of operations that used a predator management practice.

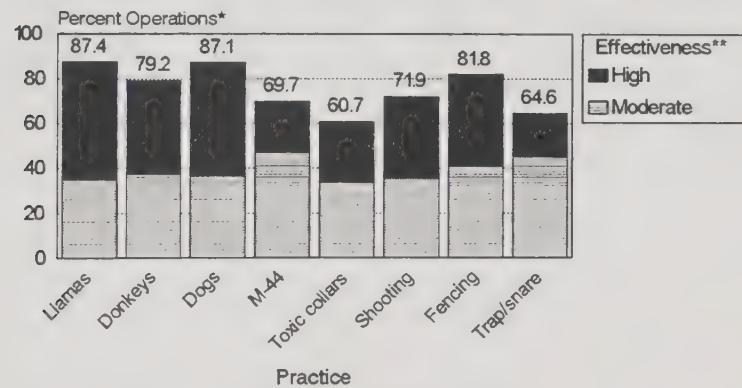
#3205

¹ Includes penning at night, other guardian animals, lights and noises, and USDA:APHIS:Animal Damage Control.

b. Of operations that used the following predator management practices, percent of operations by producer-judged effectiveness:

	<u>Percent Operations</u>								
	Not Effective	Standard Error	Low Effectiveness	Standard Error	Moderate Effectiveness	Standard Error	High Effectiveness	Standard Error	Total
i. Guardian Animals									
Llamas	1.4	(± 0.4)	11.2	(± 2.1)	34.7	(± 5.2)	52.7	(± 5.3)	100.0
Donkeys	3.4	(± 0.8)	17.4	(± 3.1)	37.4	(± 3.9)	41.8	(± 4.2)	100.0
Dogs	1.0	(± 0.4)	11.9	(± 1.5)	36.6	(± 2.2)	50.5	(± 2.3)	100.0
ii. Lethal Methods									
M-44	2.2	(± 1.0)	28.1	(± 3.8)	47.1	(± 3.9)	22.6	(± 2.9)	100.0
Toxic collars	7.0	(± 3.6)	32.3	(± 6.9)	33.7	(± 6.4)	27.0	(± 6.7)	100.0
Shooting	3.2	(± 0.6)	24.9	(± 1.7)	35.3	(± 1.9)	36.6	(± 1.8)	100.0
iii. Other Methods									
Fencing	3.1	(± 0.5)	15.1	(± 1.2)	40.8	(± 1.9)	41.0	(± 1.9)	100.0
Trap/snare	6.8	(± 1.4)	28.6	(± 2.4)	45.2	(± 2.7)	19.4	(± 2.0)	100.0
Other	2.4	(± 1.7)	3.7	(± 1.2)	27.7	(± 4.2)	66.2	(± 4.5)	100.0

Percent of Operations* by Producer-Judged Effectiveness of Predator Management Practices Used



*Of operations that used a predator management practice.

**Not shown: not effective or low effectiveness.

#3206

E. Economics

1. Gross income

a. Operation average percent of gross income by category:

<u>Category</u>	<u>Operation Average</u>	<u>Standard Error</u>
Slaughter lambs	49.9	(± 1.0)
Feeder lambs	22.1	(± 0.8)
Club lambs	7.1	(± 0.5)
Seedstock, purebred	4.5	(± 0.4)
Seedstock, commercial	2.3	(± 0.3)
Wool	12.3	(± 0.5)
Milk	0.2	(± 0.0)
Other	<u>1.6</u>	(± 0.2)
Total	100.0	

i. Operation average percent of gross income by category and flock size:

<u>Category</u>	<u>Operation Average Percent</u>			<u>Number Sheep</u>			<u>Standard Error</u>	<u>1,000 or More</u>	<u>Standard Error</u>	
	<u>Less than 50</u>	<u>Standard Error</u>	<u>50-99</u>	<u>Standard Error</u>	<u>100-499</u>	<u>Standard Error</u>				
Slaughter lambs	51.7	(± 1.4)	48.1	(± 1.9)	45.8	(± 1.4)	32.9	(± 2.7)	33.2	(± 2.0)
Feeder lambs	20.8	(± 1.1)	21.6	(± 1.6)	25.1	(± 1.3)	38.7	(± 2.9)	39.7	(± 1.8)
Club lambs	7.4	(± 0.7)	8.2	(± 1.1)	6.0	(± 1.0)	1.9	(± 0.6)	0.8	(± 0.3)
Seedstock, purebred	4.2	(± 0.5)	6.7	(± 1.0)	5.2	(± 0.5)	1.8	(± 0.4)	0.7	(± 0.2)
Seedstock, commercial	2.3	(± 0.5)	2.0	(± 0.3)	2.3	(± 0.3)	2.7	(± 0.9)	4.4	(± 0.9)
Wool	11.9	(± 0.6)	11.6	(± 0.7)	13.8	(± 0.5)	17.8	(± 1.0)	19.4	(± 0.7)
Milk	0.2	(± 0.1)	0.1	(± 0.1)	0.1	(± 0.0)	0.4	(± 0.2)	0.4	(± 0.2)
Other	<u>1.5</u>	(± 0.3)	<u>1.7</u>	(± 0.5)	<u>1.7</u>	(± 0.3)	<u>3.8</u>	(± 0.8)	<u>1.4</u>	(± 0.3)
Total	100.0		100.0		100.0		100.0		100.0	

b. Percent of operations that received any income from each category:

<u>Category</u>	<u>Percent Operations</u>	<u>Standard Error</u>
Slaughter lambs	71.5	(± 1.1)
Feeder lambs	39.6	(± 1.2)
Club lambs	20.1	(± 1.0)
Seedstock, purebred	14.4	(± 0.8)
Seedstock, commercial	11.8	(± 0.8)
Wool	76.6	(± 1.1)
Milk	1.2	(± 0.3)
Other	5.5	(± 0.5)

i. Percent of operations that received any income from each category by flock size:

<u>Category</u>	<u>Percent Operations</u>									
	<u>Number Sheep</u>									
	<u>Less than 50</u>	<u>Standard Error</u>	<u>50-99</u>	<u>Standard Error</u>	<u>100-499</u>	<u>Standard Error</u>	<u>500-999</u>	<u>Standard Error</u>	<u>1,000 or More</u>	<u>Standard Error</u>
Slaughter lambs	72.5	(± 1.5)	74.9	(± 2.2)	68.7	(± 1.8)	49.9	(± 3.5)	49.7	(± 2.6)
Feeder lambs	36.9	(± 1.6)	42.2	(± 2.4)	46.5	(± 1.9)	64.7	(± 3.9)	67.4	(± 2.4)
Club lambs	19.9	(± 1.3)	26.0	(± 2.1)	18.7	(± 1.7)	8.6	(± 1.8)	8.1	(± 2.3)
Seedstock, purebred	13.0	(± 1.1)	21.6	(± 1.9)	18.1	(± 1.3)	9.7	(± 1.8)	6.0	(± 1.2)
Seedstock, commercial	10.2	(± 1.0)	15.5	(± 1.7)	16.1	(± 1.2)	14.2	(± 3.2)	24.1	(± 2.6)
Wool	71.8	(± 1.5)	86.6	(± 1.6)	92.1	(± 1.3)	92.4	(± 2.5)	95.7	(± 0.9)
Milk	1.3	(± 0.3)	0.6	(± 0.2)	0.9	(± 0.3)	3.0	(± 1.2)	1.6	(± 0.6)
Other	4.9	(± 0.7)	7.1	(± 1.3)	6.2	(± 0.8)	14.1	(± 3.2)	8.0	(± 1.4)

2. Profitability limitations

a. Percent of operations by categories that limited profitability:

<u>Category</u>	<u>Percent Operations</u>	<u>Standard Error</u>
Capital (debt)	21.1	(± 0.9)
Labor	26.8	(± 1.0)
<u>Land</u>	<u>35.2</u>	<u>(± 1.2)</u>
Feed	42.9	(± 1.2)
Availability of sheep	8.3	(± 0.6)
<u>Breed of sheep</u>	<u>6.4</u>	<u>(± 0.6)</u>
Family succession	7.6	(± 0.6)
Government regulations	19.9	(± 0.9)
<u>Access to markets</u>	<u>30.8</u>	<u>(± 1.1)</u>
Price volatility	50.0	(± 1.2)
Operator interest and enthusiasm	18.5	(± 1.0)
Other	15.2	(± 0.9)

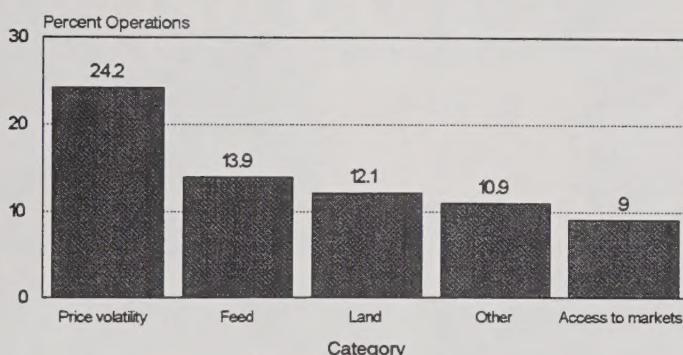
i. Percent of operations by categories that limited profitability and flock size:

<u>Category</u>	Percent Operations			Number Sheep			Standard Error	1,000 or More	Standard Error	
	Less than 50	Standard Error	50-99	Standard Error	100-499	Standard Error				
Capital (debt)	17.8	(± 1.1)	27.1	(± 2.2)	31.8	(± 1.9)	37.2	(± 3.3)	46.9	(± 2.9)
Labor	22.7	(± 1.2)	32.4	(± 2.2)	40.7	(± 2.0)	48.0	(± 4.1)	61.0	(± 2.7)
Land	33.7	(± 1.5)	38.5	(± 2.3)	39.5	(± 1.8)	48.7	(± 3.5)	41.7	(± 2.9)
Feed	40.9	(± 1.5)	46.9	(± 2.4)	48.6	(± 2.0)	53.1	(± 4.1)	59.6	(± 2.7)
Availability of sheep	7.4	(± 0.8)	11.3	(± 1.5)	10.0	(± 1.3)	9.8	(± 2.4)	15.4	(± 2.3)
<u>Breed of sheep</u>	<u>5.9</u>	<u>(± 0.7)</u>	<u>9.4</u>	<u>(± 1.5)</u>	<u>6.7</u>	<u>(± 0.9)</u>	<u>4.6</u>	<u>(± 1.2)</u>	<u>6.7</u>	<u>(± 1.7)</u>
Family succession	6.9	(± 0.7)	10.7	(± 1.5)	7.2	(± 0.8)	10.4	(± 2.0)	14.5	(± 2.0)
Government regulations	15.9	(± 1.1)	23.7	(± 2.0)	31.1	(± 2.0)	50.8	(± 4.1)	71.3	(± 2.4)
<u>Access to markets</u>	<u>30.2</u>	<u>(± 1.4)</u>	<u>29.9</u>	<u>(± 2.1)</u>	<u>33.6</u>	<u>(± 1.9)</u>	<u>36.6</u>	<u>(± 4.0)</u>	<u>43.3</u>	<u>(± 2.9)</u>
Price volatility	45.3	(± 1.6)	56.7	(± 2.3)	65.3	(± 1.9)	80.6	(± 2.6)	83.8	(± 1.8)
Operator interest and enthusiasm	19.9	(± 1.2)	16.8	(± 1.8)	13.2	(± 1.2)	9.4	(± 2.0)	14.4	(± 2.5)
Other	15.3	(± 1.2)	13.6	(± 1.4)	14.1	(± 1.3)	20.8	(± 3.7)	22.3	(± 2.1)

b. Percent of operations by most important category that limited profitability:

<u>Category</u>	<u>Percent Operations</u>	<u>Standard Error</u>
Capital (debt)	6.2	(± 0.6)
Labor	5.8	(± 0.6)
<u>Land</u>	<u>12.1</u>	<u>(± 1.0)</u>
Feed	13.9	(± 0.9)
Availability of sheep	1.6	(± 0.3)
<u>Breed of sheep</u>	<u>0.7</u>	<u>(± 0.2)</u>
Family succession	1.3	(± 0.3)
Government regulations	4.2	(± 0.5)
<u>Access to markets</u>	<u>9.0</u>	<u>(± 0.9)</u>
Price volatility	24.2	(± 1.1)
Operator interest and enthusiasm	6.2	(± 0.7)
<u>Other</u>	<u>10.9</u>	<u>(± 0.9)</u>
Multiple	<u>3.9</u>	<u>(± 0.5)</u>
Total	100.0	

Percent of Operations by Top Five Most Important Categories that Limited Profitability



#3207

i. Percent of operations by most important category that limited profitability by flock size:

<u>Category</u>	<u>Percent Operations</u>							
	<u>Number Sheep</u>		<u>50-99</u>		<u>100-499</u>		<u>500-999</u>	
	<u>Less than 50</u>	<u>Standard Error</u>						
Capital (debt)	5.5	(± 0.8)	8.3	(± 1.4)	7.7	(± 1.0)	10.4	(± 2.3)
Labor	4.9	(± 0.7)	6.6	(± 1.1)	10.5	(± 1.5)	8.5	(± 2.4)
<u>Land</u>	<u>13.0</u>	<u>(± 1.3)</u>	<u>13.1</u>	<u>(± 1.9)</u>	<u>7.6</u>	<u>(± 1.0)</u>	<u>6.4</u>	<u>(± 1.7)</u>
Feed	14.3	(± 1.2)	14.7	(± 1.8)	12.3	(± 1.4)	10.4	(± 3.7)
Availability of sheep	1.5	(± 0.4)	2.2	(± 0.8)	1.3	(± 0.4)	1.3	(± 0.6)
<u>Breed of sheep</u>	<u>0.7</u>	<u>(± 0.3)</u>	<u>1.1</u>	<u>(± 0.7)</u>	<u>0.5</u>	<u>(± 0.2)</u>	<u>0.5</u>	<u>(± 0.5)</u>
Family succession	1.5	(± 0.4)	1.1	(± 0.6)	0.2	(± 0.1)	1.3	(± 0.9)
Government regulations	3.8	(± 0.7)	3.6	(± 0.8)	4.6	(± 0.7)	10.3	(± 2.2)
<u>Access to markets</u>	<u>9.5</u>	<u>(± 1.1)</u>	<u>6.8</u>	<u>(± 1.2)</u>	<u>9.5</u>	<u>(± 1.6)</u>	<u>6.6</u>	<u>(± 3.5)</u>
Price volatility	22.3	(± 1.4)	27.2	(± 2.4)	30.8	(± 1.9)	29.7	(± 4.7)
Operator interest and enthusiasm	7.8	(± 1.0)	2.8	(± 0.9)	1.6	(± 0.5)	0.0	(± 0.0)
<u>Other</u>	<u>11.4</u>	<u>(± 1.2)</u>	<u>9.3</u>	<u>(± 1.4)</u>	<u>9.3</u>	<u>(± 1.4)</u>	<u>7.3</u>	<u>(± 1.7)</u>
Multiple	<u>3.8</u>	<u>(± 0.6)</u>	<u>3.2</u>	<u>(± 0.9)</u>	<u>4.1</u>	<u>(± 0.7)</u>	<u>7.3</u>	<u>(± 1.9)</u>
Total	100.0		100.0		100.0		100.0	

Section II: Sample Profile for Reporting Operations

A. Flock Size

1. Number of reporting operations by number of ewes present on January 1, 1996:

<u>Number Ewes</u>	<u>Number Operations</u>
0	1,072
1-49	2,050
50-99	788
100-499	827
500 or more	405
Not reported	<u>32</u>
Total	5,174

2. Number of reporting operations by total sheep inventory present on January 1, 1996:

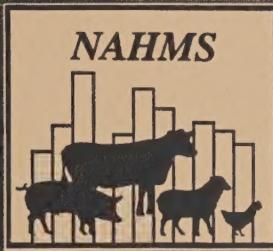
<u>Number Sheep</u>	<u>Number Operations</u>
0	1,003
1-49	1,773
50-99	788
100-499	1,062
500-999	222
1,000 or more	324
Not reported	<u>2</u>
Total	5,174

B. Type of Operation

1. Number of reporting operations by type:

<u>Type</u>	<u>Number Operations</u>
Hherded range flock	121
Fenced range flock	645
Farm flock	3,200
Intensive confinement	111
Multiple	81
Not specified	<u>1,016</u>
Total	5,174

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